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APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NO.
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EXAMINER

ART UNIT	PAPER NUMBER
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12

DATE MAILED:

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

OFFICE ACTION SUMMARY

☒ Responsive to communication(s) filed on 9-23-96

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 D.C. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire three month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-20 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-20 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of Reference Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

Serial Number: 08/717,536
Art Unit: 2609

-2-

1. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103, the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 C.F.R. § 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of potential 35 U.S.C. § 102(f) or (g) prior art under 35 U.S.C. § 103.

2. Claims 1-20 are rejected under 35 U.S.C. § 103 as being unpatentable over Kamaya et al (U.S. Patent No. 5,106,179) in view of Berman (US PAT NO. 5,050,966).

As to claims 1 and 14, Kamaya discloses a head-mounted display apparatus comprising: a matrix liquid crystal display panel (14, Figs. 2-4) to generate an image; an optical system (15, 16) that receives the generated image and to extend the optical path of the generated image by reflection of the image within the optic system, the optical system transmitting a

Serial Number: 08/717,536
Art Unit: 2609

-3-

displayable image; a viewing surface (7) to receive the displayable image from the optical system, the image on the viewing surface being viewable by a user; a display housing (2, Figs. 1-3) in which the matrix liquid crystal display panel, the optical system and the viewing surface are housed; and a support (5, 6, Fig. 1) that holds the display housing relative to the user's head. Kamaya does not specifically disclose the LCD display is an active matrix type LCD. However, the active matrix type LCD is well known in the art. It is desirable to use active matrix type LCD because it can provide a high quality and very sharp image to a user. Further, Kamaya does not disclose that the optical system directs the image onto a cholesteric liquid crystal element. However, such a cholesteric liquid crystal element in a optical system for a helmet display is well known in the art such as taught by Berman. As shown in Fig. 2A, Berman discloses a polarizer (30) to polarize the generated image in a first orientation to a second orientation, a partially-transmissive concave mirror (42) having a light transmissive first surface to transmit the generated image and a reflective surface to alter the polarization of light incident on the first surface and a cholesteric liquid crystal element (44) having a first polarization back toward the second surface of the mirror and to transmit light having a second polarization. The cholesteric liquid crystal element of Berman functions the same way as to applicants claimed invention. It would have been

Serial Number: 08/717,536
Art Unit: 2609

-4-

obvious to one of ordinary skill in the art to have modified Kamaya the optical system with the features of the optical system of Berman, so that the viewer can view the image projected by LCD and the image incident from outside.

As to claim 2, It is well known in the art that the active matrix liquid crystal comprised transistors as a switch element for each display element and those transistors are bonded to an optically transmissive substrate with an adhesive layer.

As to claim 4, Kamaya discloses that the image is processed by reflection with the optical system (15, 16).

As to claims 3, 5-8 and 15-18 Kamaya does not specifically disclose the optic system comprising a polarizer, a partially-transmissive concave mirror and a cholesteric liquid crystal mirror and a cholesteric liquid crystal element. However, such elements in a optical system for a helmet display is well known in the art such as taught by Berman. As shown in Fig. 2A, Berman discloses a polarizer (30) to polarize the generated image in a first orientation to a second orientation, a partially-transmissive concave mirror (42) having a light transmissive first surface to transmit the generated image and a reflective surface to alter the polarization of light incident on the first surface and a cholesteric liquid crystal element (44) having a first polarization back toward the second surface of the mirror and to transmit light having a second polarization. It would have been obvious to one of ordinary skill in the art to have

Serial Number: 08/717,536
Art Unit: 2609

-5-

modified Kamaya the optical system with the features of the optical system of Berman, so that the viewer can view the image projected by LCD and the image incident from outside.

As to claim 9, Berman discloses an optical combiner (30) which combines the projection image with a viewing image.

As to claim 10, Berman discloses that the viewing image is a direct view image.

As the claim 11, Berman discloses that the optical combiner is a partially transmissive mirror.

As to claims 12-13 and 19-20, Kamaya discloses that the display system is a binocular display system or a monocular display system.

3. This is a continuation of applicant's earlier application S.N. 08/327,113. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds or art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See M.P.E.P. § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE

Serial Number: 08/717,536
Art Unit: 2609

-6-

ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.


4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiao Wu whose telephone number is (703) 305-4721. The examiner can normally be reached on Monday to Friday from 8:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe, can be reached on (703) 305-4709. The fax phone number for this Group is (703) 305-3989.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4700.

XW

January 3, 1997


XIAO WU
PATENT EXAMINER
ART UNIT 2609